

## **Spin Memory (formerly Spin Transfer Technologies) announces Series B fundraise and signs commercial agreements with Arm and Applied Materials**

\$52 million Series B round

Commercial agreement with Applied Materials to create a comprehensive embedded MRAM solution

Licensing agreement with Arm covering Spin Memory's Endurance Engine™

Spin Transfer Technologies to re-brand as Spin Memory

Boston, MA (12 November 2018) - Allied Minds portfolio company, Spin Memory, Inc., (Spin Memory) the leading MRAM developer formerly known as Spin Transfer Technologies, Inc., today announced its \$52 million Series B funding round, and entry into a commercial agreement with Arm for the licensing of Spin Memory's Endurance Engine design IP to address static random-access memory (SRAM) applications, and a commercial agreement with Applied Materials, Inc. (Applied) to create a comprehensive embedded MRAM solution.

### **Fund-raise and summary**

This funding round was led by Applied Ventures LLC, the venture capital arm of Applied Materials, Inc. (Applied), and Arm. The round is comprised of \$29.0 million raised or otherwise committed from these new investors, as well as existing investors, and \$23.0 million from the exercise of convertible securities subscribed for in an earlier bridge round by Allied Minds, Woodford Investment Management and Invesco Asset Management.

Along with the funding, Spin Memory announced a commercial agreement with Applied to create a comprehensive embedded MRAM solution - and a commercial agreement with Arm for the licensing of Spin Memory's Endurance Engine design IP to address static random-access memory (SRAM) application in SoCs.

The funding and commercial agreements represent a new model of collaboration that Spin Memory is driving to establish MRAM as a mainstream alternative to embedded SRAM and a range of other non-volatile memories.

"These new agreements with Applied and Arm provide Spin Memory the opportunity for strong ecosystem collaboration," said John Kispert, chairman of the board of directors at Spin Memory. "Spin Memory is driving a unique industry approach to bringing breakthrough memory technology IPs into the mainstream. We are proud to be engaging with industry leaders in our mission to enable new and exciting embedded memory applications."

### **Spin Memory - Arm licensing agreement**

Spin Memory has signed a licensing agreement with Arm, the world's leading semiconductor IP company. The licensing agreement extends to Spin Memory's Endurance Engine™ technology and related IP, and governs the terms on which Arm and Spin Memory will work together to create SRAM-class magnetoresistive random-access memory (MRAM) design solutions based on this proprietary technology.

Under the licensing agreement, Spin Memory will provide Arm its innovative Endurance Engine design architecture to develop a new line of embedded MRAM design IP. This MRAM design IP will address

static random-access memory (SRAM) application in SoCs, with denser and lower power solutions than typically achieved with the current 6T SRAM cell-based IP.

"Technologies like AI, 5G, ADAS and IoT demand more power and area-efficient embedded memory than the existing SRAM and eFlash solutions. These requirements are leading the industry to rethink the way chips are developed - including their memory IP content," said Gus Yeung, VP, GM, and Fellow, Physical Design Group, Arm. "Arm's work with Spin Memory aims to address a key design challenge and enable broader adoption of MRAM design in SoCs."

"With the challenges currently facing SRAM, we have long seen demand for a new memory that could replace SRAM and suitably support the needs of technologies like AI or IoT," said Tom Sparkman, CEO of Spin Memory. "Through our collaboration with Arm, our objective is to combine our Endurance Engine with Arm's IP to provide an MRAM design solution that satisfies the growing need for a denser, lower power SRAM replacement."

### **Spin Memory - Applied commercial agreement**

Under the commercial agreement with Applied, the parties will create a comprehensive embedded MRAM solution. The solution brings together Applied's industry-leading deposition and etch capabilities with Spin Memory's MRAM process IP.

Key elements of the offering include Applied innovations in PVD and etch process technology, Spin Memory's revolutionary [Precessional Spin Current™](#) (PSC) structure (also known as the Spin Polarizer), and industry leading perpendicular magnetic tunnel junction (pMTJ) technology from both companies. The solution is designed to allow customers to quickly bring up an embedded MRAM manufacturing module and start producing world-class MRAM-enabled products for both non-volatile (flash-like) and SRAM-replacement applications. Spin Memory intends to make the solution commercially available from 2019.

"In the AI and IoT era, the industry needs high-speed, area-efficient non-volatile memory like never before," said Tom Sparkman, CEO at Spin Memory. "Through our collaboration with Applied Materials, we will bring the next generation of STT-MRAM to market and address this growing need for alternative memory solutions."

"Our industry is driving a new wave of computing that will result in billions of sensors and a dramatic increase in data generation," said Steve Ghanayem, senior vice president of New Markets and Alliances at Applied Materials. "As a result, we are seeing a renaissance in hardware innovation, from materials to systems, and we are excited to be teaming up with Spin Memory to help accelerate the availability of a new memory."

### **Re-branding as Spin Memory**

Previously known as Spin Transfer Technologies, the company has rebranded itself as Spin Memory to differentiate itself from its former business goals and objectives. "Our company has completely transformed over recent years - moving from delivering industry-changing technologies to offering a full suite of MRAM solutions," said Tom Sparkman, CEO at Spin Memory. "The rebranding reflects this shift in intent, as we transform the industry with a new MRAM IP ecosystem, overcoming the limitations of today's embedded memories."

### **Implications of the fundraising for Allied Minds**

The balance of the raise not subscribed by Arm and Applied is expected to be provided by additional new strategic and financial investors in a second closing to be concluded in due course. Allied Minds is backstopping this component of the raise in the interim.

The fundraising was completed at a pre-money valuation that is the same as the valuation included in Allied Minds' OAV stated at our H1 2018 results. Following the completion of the second closing of the transaction, Allied Minds' ownership of Spin Memory's issued share capital is expected to be 40.88%.

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For more information, please contact:

**Allied Minds plc**

Neil Pizey, Head of Corporate Development

+44 7771 872 922

[IR@alliedminds.com](mailto:IR@alliedminds.com)

**FTI Consulting**

Ben Atwell / Brett Pollard

+44 20 3727 1000

**About Allied Minds**

Allied Minds plc is an IP commercialisation company focused on early stage company creation and development within the technology and life science sectors. With origination relationships spanning US federal laboratories, universities, and leading US corporations, Allied Minds sources, operates and funds a portfolio of companies to generate long-term value for its investors and stakeholders. Based in Boston, Allied Minds supports its businesses with capital, management, expertise and shared services. For more information, please visit [www.alliedminds.com](http://www.alliedminds.com)

**About Spin Memory**

Spin Memory, Inc. (formerly Spin Transfer Technologies, Inc.) is the pre-eminent MRAM IP supplier. Through collaboration with industry leaders, Spin Memory is transforming the semiconductor industry by solving memory challenges vital for AI, ADAS, 5G, IoT and more. Spin Memory's disruptive STT-MRAM technologies and products provide SRAM-like speed and endurance that can replace SRAM and ultimately DRAM in both embedded and stand-alone applications. For more information, please visit [www.spinmemory.com](http://www.spinmemory.com).

**About the Endurance Engine**

Spin Memory's Endurance Engine technology is a breakthrough advancement that solves the previous endurance deficiencies of all other MRAM design solutions, bringing MRAM array performance up to SRAM performance levels. The Endurance Engine is a combination of circuits and design architectures that provide up to six orders of magnitude improvement in endurance while enabling SRAM-like Read and Write speeds by utilizing pMTJ's stochastic behavior (pMTJ or perpendicular magnetic tunnel junction is the core magnetics technology of MRAM). For example, if a standard MRAM solution offers  $10^8$  cycles of endurance - typical of today's commercial offerings - then adding the Endurance Engine technologies will increase the endurance to beyond  $10^{14}$  cycles - sufficient for nearly all SRAM and DRAM (dynamic random-access memory) applications. And since the Endurance Engine is wholly implemented using digital circuitry, it can be fabricated in any logic or memory digital process and is designed to work with any pMTJ.

**About the Spin Polarizer (also known as PSC)**

The PSC structure increases the spin-torque efficiency of any MRAM device by 40-70 percent - enabling any MRAM to achieve dramatically higher data retention while consuming less power. Applications set to see significant benefits of MRAM with the PSC structure include: datacenters, IoT and autonomous driving. Because it requires no additional materials or tools than those already used in the production of STT-MRAM - the PSC structure adds virtually no complexity or cost for customers and can be seamlessly incorporated into any MRAM manufacturer's existing process.

**Allied Minds Forward-Looking Statement**

This press release contains statements that are or may be forward-looking statements, including statements that relate to Allied Minds' future prospects, developments and strategies. The forward-looking statements are based on current expectations and are subject to known and unknown risks and uncertainties that could cause actual results, performance and achievements to differ materially from current expectations, including, but not limited to, those risks and uncertainties described in the risk factors included in Allied Minds' regulatory filings. These forward-looking statements are based on assumptions regarding the present and future business strategies of Allied Minds and the environment in which it will operate in the future. Each forward-looking statement speaks only as at the date of this

press release. Except as required by law, regulatory requirement, the Listing Rules and the Disclosure Guidance and Transparency Rules, neither Allied Minds nor any other party intends to update or revise these forward-looking statements, whether as a result of new information, future events or otherwise.

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